APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,293	11/06/2003	Antonio Trias Bonet	010758/00003	8079

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EXAMINER
WEST, JEFFREY R

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/702,293	BONET, ANTONIO TRIAS
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _27 July 2004_.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-11_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1-11_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on _06 November 2003_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _07/27/04_.
4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

1. The Examiner requests copies of the relevant pages of the following references

listed on page 20 of the specification as they are considered to be pertinent to the

examination of the instant application:

Bultheel, "Division Algorithms for Continued Fractions and the Pade Table" and

Baker et al., "Pade Approximants, Second Addition".

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5)

because they include the following reference character(s) not mentioned in the

description: "1106".

3. The drawings in Figures 1B-1E are objected to because they are too dark making

unclear as to what is being presented.

4. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to

the specification to add the reference character(s) in the description in compliance

with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment

of the application. Any amended replacement drawing sheet should include all of the

figures appearing on the immediate prior version of the sheet, even if only one figure

is being amended. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective

action in the next Office action. The objection to the drawings will not be held in

abeyance.

Specification

5. The disclosure is objected to because of the following informalities:

On page 4, line 10, reference is made to U.S. Patent No. 6,141,482 to Flint et al.;

while U.S. Patent No. 6,141,482 is issued to Massarksy.

On page 7, line 1, "power plow" should be ---power flow---.

Appropriate correction is required.

Claim Objections

6. Claims 1, 5, and 8-11 are objected to because of the following informalities:

In claim 1, line 1, to avoid problems of antecedent basis, "the state" should be ---

a state---.

In claim 1, line 6, to avoid problems of antecedent basis, "the condition" should

be ---a condition---.

In claim 1, line 7, "series values" should be ---series, values---.

In claim 5, line 6, to avoid problems of antecedent basis, "the condition" should

be ---a condition---.

In claim 5, line 7, "series values" should be ---series, values---.

In claim 8, line 6, to avoid problems of antecedent basis, "the current" should be -

--a current---.

In claim 8, line 7, to avoid problems of antecedent basis, "the current" should be -

-- a current---.

In claim 9, line 1, "8, said" should be ---8, wherein said---.

In claim 10, line 2, to avoid problems of antecedent basis, "the sum" should be ---

a sum---.

In claim 10, line 2, to avoid problems of antecedent basis, "physical current"

should be ---current, physical---.

In claim 11, line 13, to avoid problems of antecedent basis, "the condition" should

be ---a condition---.

In claim 11, line 14, "series values" should be ---series, values---.

In claim 11, line 22, to avoid problems of antecedent basis, "the state" should be

---a state---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

8. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

Claim 1 is considered to be vague and indefinite because it refers to "the nominal voltage" while there is no previous mention of any "nominal voltage". Therefore, it is unclear to one having ordinary skill in the art as to what voltage "the nominal voltage" refers.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, because it refers to "the 0-case value of each parameter" while there is no previous mention of any "0-case value". Therefore, it is unclear to one having ordinary skill in the art as to what value the "0-case value" refers.

Claim 1 is considered to be vague and indefinite because it refers to "the power series coefficients produced in step b" and "the n-order approximant of the continued fraction approximation produced in step c" while steps b and c contain no mention of any "power series coefficients" or "n-order approximate", respectively.

Claim 5 is considered to be vague and indefinite because it refers to "the nominal voltage" while there is no previous mention of any "nominal voltage". Therefore, it is unclear to one having ordinary skill in the art as to what voltage "the nominal voltage" refers.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, because it refers to "the 0-case value of each parameter" while there is no previous mention of any "0-case value". Therefore, it is unclear to one having ordinary skill in the art as to what value the "0-case value" refers.

Claim 5 is considered to be vague and indefinite because it refers to "the power series coefficients produced in step b" and "the n-order approximant of the continued

fraction approximation produced in step c" while steps b and c contain no mention of any "power series coefficients" or "n-order approximate", respectively.

Claim 8 is considered to be vague and indefinite because it refers to "the load flow equations (L)" while there is no previous mention of any "load flow equations". Therefore, it is unclear to one having ordinary skill in the art as to what equations "the load flow equations (L)" refers.

Claim 8 is considered to be vague and indefinite because it refers to "the nominal voltage" while there is no previous mention of any "nominal voltage". Therefore, it is unclear to one having ordinary skill in the art as to what voltage "the nominal voltage" refers.

Claim 8 is further considered to be vague and indefinite because it includes a limitation to "develop a mathematical model of the current, physical solution" in step b. Step a, however, already includes a limitation for "generating a mathematical model of a known, physical solution". Therefore, it is unclear to one having ordinary skill in the art as to whether the two separate recitations of "a mathematical model" refer to the same model, or refer to separate models.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, because it refers to "the 0-case value of each quantity" while there is no previous mention of any "0-case value". Therefore, it is unclear to one having ordinary skill in the art as to what value the "0-case value" refers.

Claim 11 is considered to be vague and indefinite because it refers to "the nominal voltage" while there is no previous mention of any "nominal voltage".

Therefore, it is unclear to one having ordinary skill in the art as to what voltage "the nominal voltage" refers.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, because it refers to "the 0-case value of each parameter" while there is no previous mention of any "0-case value". Therefore, it is unclear to one having ordinary skill in the art as to what value the "0-case value" refers.

Claim 11 is considered to be vague and indefinite because it refers to "the power series coefficients produced in step c" and "the n-order approximant of the continued fraction approximation produced in step d" while steps c and d contain no mention of any "power series coefficients" or "n-order approximate", respectively.

Claims 2-4, 6, 7, and 10 are rejected under 35 U.S.C. 112, second paragraph, because they incorporate the lack of clarity present in their respective parent claims.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 5, and 8-10, as may best be understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al., "A Computation of Power System Characteristic by General Homotopy and Investigation of its Stability" in view of Numerical Recipes, "Evaluation of Continued Fractions".

Okumura discloses a method for determining the state of stability of an electrical

grid having n nodes (page 2745, columns 1-2, "Equation of Power System")

comprising the steps of embedding load flow equations representing the electrical

grid in parametric homotopy (page 2745, column 1, "Abstract" and page 2745,

column 2 to page 2746, column 1, "Solution by HCM") as a mathematical model that

goes continuously from a known 0-case, in which all voltages are equal to the

nominal voltage and there is no energy flow in links of the grid (i.e. flat start), to an

objective case representative of the grid in the condition for which stability is to be

determined (i.e. load flow solution) (page 2746, column 1, "Solution by HCM"),

developing in power series values of the load flow equations' unknowns in the

parameters of the parametric homotopy in a neighborhood of the 0-case value of

each parameter (page 2746, column 1 to column 2, "Solution by HCM" through

"Stability Investigation of Solutions"), and displaying the solution to the load flow

equations as a measure of the state of stability of the electrical grid (page 2746,

column 2, "Several Examples" to page 2747, column 1, "PG V-Curves and

Stability").

Okumura discloses developing a power series expansion of all quantities in a

parametric homotopy formed from said load flow equations in a neighborhood of the

0-case value of each quantity (page 2746, column 1, "Stability Investigation of

Solutions").

As noted above, the invention of Okumura teaches many of the features of the

claimed invention and while Okumura does teach determining stability by performing

a power series expansion in order to determine a load flow solution if/when the result

of the equation converges (page 2746, column 1, "Stability Investigation of

Solutions"), Okumura does not specify determining the solution by computing a

continued fraction approximation to the power series coefficients and evaluating the

n-order approximate.

Recipes teaches the use of continued fractions to determine when a solution

results from conversion of a power series and using a result that relates to continued

fractions to rational approximations by evaluating a n-order algebraic approximant of

the continued fraction for a sum of power series coefficients (page 169-170,

"Evaluation of Continued Fractions").

It would have been obvious to one having ordinary skill in the art to modify the

invention of Okumura to include determining the solution by computing a continued

fraction approximation to the power series coefficients and evaluating the n-order

approximate, as taught by Recipes, because, as suggested by Recipes, the

combination would have improved the efficiently of the method of Okumura in the

common applications containing lengthy power series, by determining the

convergent much more rapidly than the power series expansion of Okumura (page

169, "Evaluation of Continued Fractions").

11. Claims 2-4, 6, 7, and 11, as may best be understood, are rejected under 35

U.S.C. 103(a) as being unpatentable over Okumura in view of Recipes and further in

view of U.S. Patent Application Publication No. 2003/0040846 to Rehtanz et al.

As noted above, the invention of Okumura and Recipes teaches many of the features of the claimed invention and while the invention of Okumura and Recipes does teach forming load flow equations from steady state information regarding a particular electrical grid (Okumura, page 2745, column 2, "Solution by HCM"), the combination does not specifically disclose continuously obtaining the steady state information from a supervisory and data acquisition system collecting data from the electrical grid in communication with a microprocessor-controlled energy management system comprising executable computer instructions. Further, while the combination does determine a solution, the combination does not specifically confirm whether the solution is physical.

Rehtanz teaches stability prediction for an electric power network including a supervisory control and data acquisition adapted to continuously collect data from an electrical grid indicative of electrical conditions of said electrical grid (0002, lines 1-17), said supervisory control and data acquisition system being in communication with a microprocessor controlled energy management system comprising executable computer instructions (0012, lines 1-10 and 0025, lines 9-12) to determine a continuous, real-time estimate (0036, lines 1-6 and 0060, lines 1-10) of the stability of the electrical grid (0004, lines 1-5) by generating a solution to load flow equations (0029, line 16 to 0030, line 3) as well as confirm that a set of voltages are representative of a physical electrical state (i.e. a real solution exists) (0034, lines 1-15 and 0064, lines 1-6).

It would have been obvious to one having ordinary skill in the art to modify the invention of Okumura and Recipes to specifically disclose confirming whether the solution is physical by continuously obtaining the steady state information from a supervisory and data acquisition system collecting data from the electrical grid in communication with a microprocessor-controlled energy management system comprising executable computer instructions, as taught by Rehtanz, because, as suggested by Rehtanz, the combination would have provided a common supervisory system for using the method of Okumura and Recipes to improve power systems by controlling the power generation and load flow (0002, lines 1-11) and insuring that accurate control takes place quickly by confirming the existence of a solution (0064, lines 1-6) and avoiding delay between data capture and subsequent corrective actions (0060, lines 1-10).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent Application No. 2001/0040446 to Lapinski et al. teaches an apparatus and method for the measurement and monitoring of electrical power generation and transmission.

U.S. Patent No. 6,785,592 to Smith et al. teaches a system and method for energy management.

Tolikas et al., "Homotopy Methods for Solving Decoupled Power Flow Equations"
teaches the application of different homotopies to solving the load flow problem.

Zhigang et al., "A New Method to Calculate Multiple Power Flow Solutions"
teaches a new method to calculate multiple power flow solutions using the concept
of homotopy continuation method and toroidal mapping.

Salam et al., "Parallel Processing for the Load Flow of Power Systems: The
Approach and Applications" teaches a homotopy-based computational parallel
algorithms for solving for all the roots of a system of algebraic polynomial equations.

Guo et al., "The Real Homotopy-Based Method for Computing Solutions of
Electric Power Systems" teaches a method to calculate the roots of any system of
polynomial equations in n real variables.

Guo et al., "The Homotopy Continuation Method to Approach Voltage Collapse of
Electrical Power Systems" teaches a homotopy continuation method to approach
voltage collapse point by tracing system operation conditions near or at the system
bifurcation point.

Iba et al., "Calculation of Critical Loading Condition with Nose Curve Using
Homotopy Continuation Method" teaches a new method for calculating power
systems nose curves and critical loading conditions.

13. Any inquiry concerning this communication or earlier communications from the
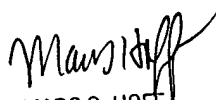
examiner should be directed to Jeffrey R. West whose telephone number is

(571)272-2226. The examiner can normally be reached on Monday through Friday,

8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-

9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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jrw
March 31, 2005

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